GC/9-65

GENERAL CATALOG

DYNAMIC ANALYZERS

*

TRACKING FILTERS

*

GENERAL-PURPOSE SWEEP OSCILLATORS

*

SYSTEMS FOR ANALYSIS OF
STRUCTURES, ROTATING MACHINES
AND DYNAMIC DATA

SPECTRAL DYNAMICS CORPORATION OF SAN DIEGO

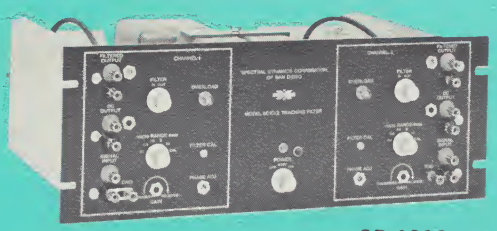
POST OFFICE BOX 671,
SAN DIEGO, CALIFORNIA 92112, TELEPHONE 714-278-2501

DYNAMIC ANALYZERS

SD-101A

SD-101AS

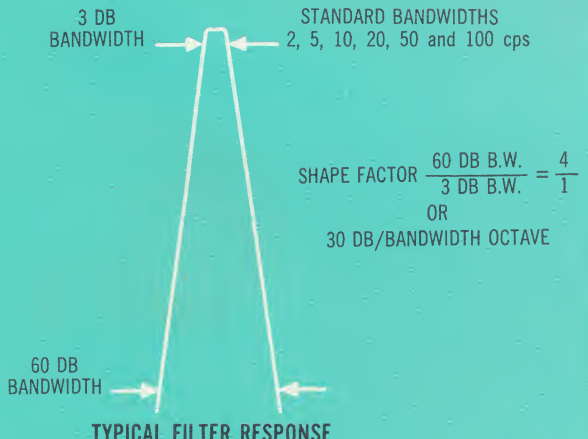
TRACKING FILTERS



SD-1012

SD-1010

PLUG-IN CRYSTAL FILTERS



TYPICAL FILTER RESPONSE

SD-101A DYNAMIC ANALYZER

A frequency-tuned bandpass filter (tracking filter) in which the center frequency of any selected pass band is continuously and inherently tuned to track the frequency from an external sine-wave source can be tuned from a wide variety of sine-wave sources such as tape, oscillators, tachometers, etc.

The SD-101A operates in two modes: (1) as a synchronous tracking filter, and (2) as a swept filter for analyzing complex spectra. Completely self-contained, it provides positive tracking and precise tuning at sweep rates in excess of 20,000 CPS/sec. It has an operating frequency range of 1 cps to 30 kc, and uses interchangeable plug-in crystal filters of 2, 5, 10, 20, 50, 100 or 200 cps bandwidth. Automatic bandwidth switching is a standard feature.

The SD-101A can be teamed directly with a variety of equipment and is compatible with all existing shaker consoles. It is a key instrument in swept-sine, sine-random and swept-random vibration testing, power spectral density (PSD) analysis and the reduction of taped data. (Request Data Sheet SD-101A.)

SD-101AS DYNAMIC ANALYZER SLAVE

The SD-101AS is a special adaptation of the widely used SD-101A Dynamic Analyzer. Its widest use is in multi-channel vibration measurement and analysis systems to provide inexpensive additional channels while necessitating purchase of only one master SD-101A. One master SD-101A can drive up to 13 SD-101AS slaves. An SD-101AS can later be converted to a complete SD-101A capable of independent operation. (Request Data Sheet SD-101AS.)

SD-1012 TWO-CHANNEL TRACKING FILTER

Provides two independent, frequency tuned bandpass filter channels in a single unit. It requires an external carrier frequency tuning signal, supplied by an SD-1010 Carrier Generator (lower photo) each unit of which can drive 16 SD-1012's (i.e., 32 channels). The SD-101A Dynamic Analyzer may also be used as a carrier source and can likewise drive 32 channels. The useful frequency range of the SD-1012 is 1 cps to 30 kc. Plug-in crystal filters of 2, 5, 10, 20, 50, 100 or 200 cps bandwidth provide great selectivity. Applications include mechanical impedance measurement, where one channel is used for force and the other for response. Also, in testing complex specimens on a shaker, several SD-1012's may be used in conjunction with a multi-channel averaging control to provide a servo-control signal equal to the average output level of several accelerometers located on the specimen and shaker table. (Request Data Sheet SD-1012.)

Great flexibility is achieved by Spectral Dynamics Tracking Filters, Dynamic Analyzers and Systems through the use of plug-in crystal filters, available in a wide variety of standard bandwidths. The same series of crystal filters is employed in the SD-101A, SD-101AS, SD-1012, SD-27, SD-28 and in the systems incorporating these units.

The ease with which filters may be switched significantly decreases the time required for testing and analysis. In Power Spectral Density work, for example, low-frequency random signals may be investigated with narrow-band resolution and higher frequencies with wide-band resolution, thus permitting higher sweep speeds. In sine-wave vibration testing, this same ability to switch filters helps materially in overcoming compressor speed delay problems and optimizes the servo operation.

ACCESSORIES

SD-28 FILTER SELECTOR

Designed for use with the SD-1012 Two-Channel Tracking Filter, the SD-28 provides automatic bandwidth switching between two standard plug-in crystal filters in each channel. A separate rack-mounted unit, it simply plugs into the SD-1012 and requires no modification in the latter. The filter switching point may be set at any frequency within the Tracking Filter's operating range. Phase coherency is automatically maintained. Most important use is in multi-channel sine-servo shaker control. (Request Data Sheet SD-28.)

SD-28

SD-27 MULTI-FILTER SELECTOR

Designed for use with the SD-101A Dynamic Analyzer, the SD-27 provides automatic switching between as many as five plug-in crystal filters. It also permits pre-programming the critical operating parameters for each filter, including: (1) the sweep rate; (2) the averaging time constant; (3) the bandwidth division. As filters are switched, the pre-programmed parameters are automatically maintained. In PSD work, the SD-27 reduces analysis time considerably without sacrifice of statistical accuracy. (Request Data Sheet SD-27.)

SD-27

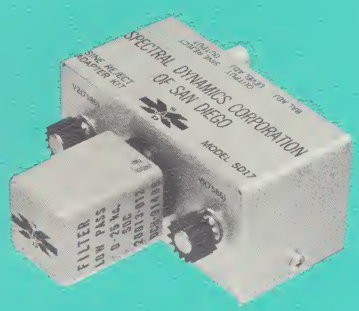
SD-22 MULTI-CHANNEL AVERAGING CONTROL

Used with tracking filters – e.g., Spectral Dynamics' SD-101, SD-101 MkII, SD-101A and SD-1012 – to provide a sine-servo control signal equal to the average of the absolute value of the fundamental amplitude of the individual filtered signals from several accelerometers, used on a complex specimen. This is useful for controlling the average "g" level on the specimen and also for protecting both shaker and specimen from damage if an accelerometer channel fails. Accommodates from two to six signals. (Request Data Sheet SD-22.)

SD-22

SD-17 SINE REJECTION ADAPTER

A traveling "notch" filter for rejecting the fundamental sine wave from the control accelerometer used for input signals to Automatic-Equalizer Analyzers during combined sine-random testing. Prevents over-compression as the sine wave travels through a particular filter pass band. For installation in the SD-101A and SD-1012. (Request Data Sheet SD-17.)



SD-17

SD-11 (COLA)

An inexpensive adapter for the Bruel and Kjaer Servo/Cycling Oscillator that provides an auxiliary oscillator output at a constant level for driving tracking filter/analyzers, frequency counters, slip-sync systems and other auxiliary equipment. Also available is the SD-11-1 (COLA), designed for operation with the B&K Model 1040. (Request Data Sheet SD-11.)

SD-11

INSTRUMENTS for ROTATING MACHINERY TESTING

DYNAMIC VIBRATION AND ACOUSTICAL ANALYSIS... HARMONIC VIBRATION ANALYSIS... PSD ANALYSIS

APPLICATIONS

- SYNCHRONOUS VIBRATION ANALYSIS OF ALL TYPES OF ROTATING MACHINERY
- ACOUSTICAL ANALYSIS
- HARMONIC ANALYSIS
- POWER SPECTRAL DENSITY ANALYSIS
- MECHANICAL IMPEDANCE MEASUREMENT
- ANALYSIS OF TAPED DATA
- GENERAL-PURPOSE LABORATORY SIGNAL GENERATION

SD-102 DYNAMIC ANALYZER TUNER (DAT)...

A highly versatile source of tuning signals for the SD-101A Dynamic Analyzer and for Tracking Filters such as the SD-1012. Through its completely interchangeable Plug-In Modules, the DAT operates in two distinct modes: (a) as a Tracking Frequency Multiplier, and (b) as a Linear/Log Sweep Generator. In the "TFM" mode, it accepts virtually any type of repetitive waveform or pulse input signal, adapting it and the SD-101A to test work on an unusually broad range of rotating machines and equipment. In the "L/LSG" mode, the DAT is used to provide electronically swept tuning signals to the SD-101A Dynamic Analyzer as well as operating by itself as a versatile laboratory signal generator. (Request Data Sheet SD-102.)

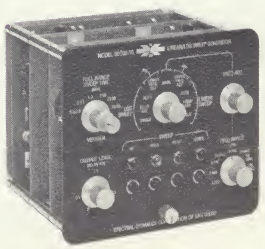
TRACKING FREQUENCY MULTIPLIER PLUG-INS (TFM's)...

Available with a wide variety of input characteristics, the TFM Plug-Ins accept and continuously track input signals from many sources: tachometers, electro-optical displacement tracking systems. proximity pickups, etc. Two outputs are provided — (a) a dc voltage proportional to input frequency, and (b) sine, triangular and square waves whose frequencies are adjustable multiples of the input frequency and vary directly with input. As machine speed varies, the DAT/TFM maintains a constant multiplication ratio and sends a synchronous tuning signal to the Dynamic Analyzer. The latter is thus enabled to analyze the vibration of a given component as a function of machine speed. (Request Data Sheets SD-102-TFM and SD-102-10.)

LINEAR/LOG SWEEP GENERATOR PLUG-IN...

With its SD-102-20 Plug-In, the DAT operates as an electronically swept oscillator with an over-all frequency range of 1 cps to 30 kc. Sweep rates are adjustable over wide limits (from 0.1 to 60 minutes), and may be programmed as either linear or logarithmic. In addition, a dc voltage proportional to frequency is provided for driving one axis on an X-Y plotter.

The DAT/SD-102-20 combination finds its greatest use as a sine wave tuning-signal source for the SD-101A Dynamic Analyzer. Operated together, the two instruments constitute a system especially useful in Power Spectral Density Analysis, Acoustic and Harmonic Analyses, Evaluation and Maintenance Testing of Rotating Machinery and Analysis of Taped Data. (Request Data Sheet SD-102-20.)



SD-103 DYNAMIC INPUT SINE CONVERTER...

Accepts a wide variety of repetitive input signals and produces a sine wave output of the exact frequency and phase-locked with the input signal. Additional outputs include constant amplitude square and triangular waves, a continued input signal, and a DC voltage proportional to input frequency. Employed in applications where repetitive phenomena must be analyzed or measured, e.g., fundamental vibration analysis (with the SD-101A) and torque or phase measurement in rotating machinery. (Request Data Sheet SD-103.)

LINEAR/LOG SWEEP OSCILLATORS

THE SD-104 . . . A COMPLETELY DIFFERENT, ALL-ELECTRONIC SWEEP OSCILLATOR FOR WORK IN THE .005 CPS TO 50 KC RANGE

The SD-104 represents a radical departure in both concept and operation from any sweep oscillator previously available. In the broad range electronic and industrial applications requiring input or excitation signals in the range of .005 cps to 50 kc, it offers features and flexibility completely new to this area of instrumentation. Outstanding among its characteristics are the following . . .

• AVAILABLE IN THREE MODELS, each with uninterrupted and automatic sweeps over a choice of several full three-decade ranges:

SD-104-1	SD-104-2	SD-104-5
0.01 cps — 10 kc in four ranges	0.02 cps — 20 kc in four ranges	0.005 cps — 50 kc in five ranges
0.1 to 10 cps	0.02 to 20 cps	0.05 to 50 cps
0.01 to 100 cps	0.2 to 200 cps	0.5 to 500 cps
1 to 1000 cps	2 to 2000 cps	5 to 5,000 cps
10 to 10,000 cps	20 to 20,000 cps	50 to 50,000 cps

• EIGHT SIMULTANEOUS OUTPUTS, including extremely accurate DC analog output voltages, permitting DIRECT plotting of data on X-Y recorders without frequency or log converters:

3 (CONSTANT AMPLITUDE). Sinewave: 1 v rms. Squarewave: 5 v p-p. Triangle Wave: 5 v p-p.
1 (VARIABLE AMPLITUDE) Sine, Square, or Triangle Wave: 0 to 10 v p-p.
3 (DC ANALOG). Positive Voltage Prop. to Log Freq.: 0 to 1 vdc. Positive Voltage Prop. to Linear Freq.: 0 to 10 vdc. Negative Voltage Prop. to Linear Freq.: 0 to 10 vdc.
1 SWEEP SYNC FOR TRIGGERING OF EXTERNAL EQUIPMENT: 2 v peak.

• EXCEPTIONALLY FLAT frequency response
• CONTINUOUSLY VARIABLE, completely electronic linear and log sweep rates
• EXTERNAL PROGRAMABILITY
• UNEQUALLED ACCURACY in frequency indication and resolution through automatic range switching of the front panel meter

The SD-104 Linear/Log Sweep Oscillator has proved especially valuable in these typical applications . . .

SINE OR SINE-RANDOM VIBRATION TESTING
POWER SPECTRAL DENSITY AND FOURIER ANALYSIS
GENERAL FREQUENCY-RESPONSE ANALYSIS
SERVO SYSTEM CONTROL AND ANALYSIS
FM SIGNAL GENERATION
ACOUSTICAL EXCITATION
BIO-MEDICAL EXCITATION AND SIMULATION

In addition to the standard features listed above, the SD-104 offers an unusual number of special capabilities and options adapting it to a broad spectrum of highly sophisticated test and analysis procedures. These are outlined in separate Data Sheet SD-104.

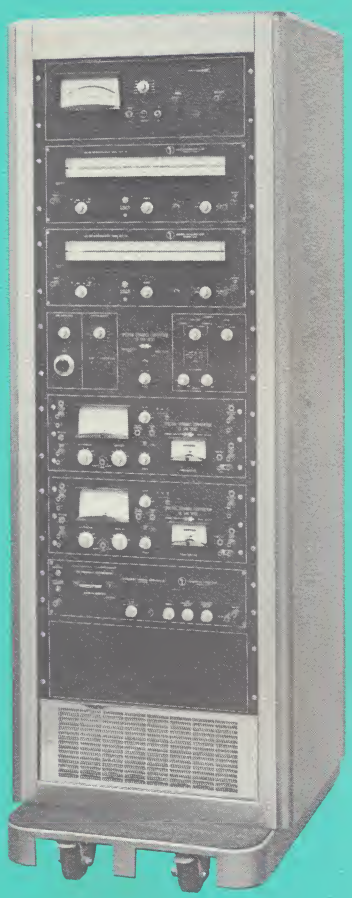
SYSTEMS AND SYSTEMS ENGINEERING

The instruments and accessories shown on the previous pages are compatible with a wide variety of commercially available equipment and may be used directly with such units in numerous applications.

Spectral Dynamics Corporation's systems policy is a flexible one, operating in two ways. First, we will work with the buyer of our individual units to ensure an effective match between the new SDC instruments and peripheral equipment already on hand. In this way, unnecessary duplication is avoided. If gaps exist in the assembly of a working system, our sales engineers will be pleased to recommend the most desirable units for purchase elsewhere by the customer.

The second and more valuable phase of SDC's systems service is the furnishing of completely integrated systems such as those shown on this and the next page. These are self-contained, compactly and efficiently packaged and include control panels designed for maximum operational convenience and speed.

When complete standard systems are purchased, we will also supply instructions, illustrations and assistance to the customer to help in deriving optimum results from the combination of the new system with his existing plotters, tape recorders, transducers, cathode followers and other instrumentation. On the other hand, we are also ready to supply over-all instrumentation for the customer's specific needs, including both our own system and all necessary peripheral equipment. The latter may be specified by the user or recommended by our own engineering department.



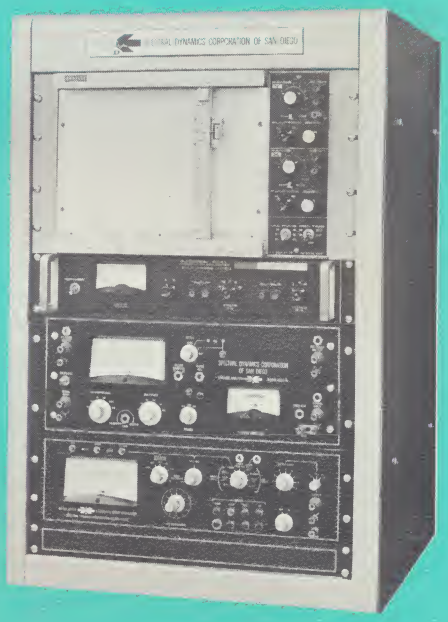
SD-1002-A

SD-1002A AUTOMATIC MECHANICAL IMPEDANCE MEASURING SYSTEM...

The SD-1002 permits accurate and complete impedance data plots in a matter of minutes instead of the hours required for manual plotting. (Mechanical Impedance is the ratio between force applied to a structure and the resulting velocity of motion produced in the structure.) Operates over frequency ranges of 5-5,000 cps, 10-10,000 cps or 20-20,000 cps with alternate plug-ins. In a separate mode, the system can be used for low-frequency transfer function analysis down to 1 cps. The SD-1002A System is highly useful in verifying ship, aircraft and missile structural design, analysis of transmissibility, measuring power spectral density, establishing optimum damping characteristics, and in many other engineering and production-test applications. (Request Data Sheet SD-1002A.)

SD-1001-1 POWER SPECTRAL DENSITY ANALYSIS SYSTEM . . .

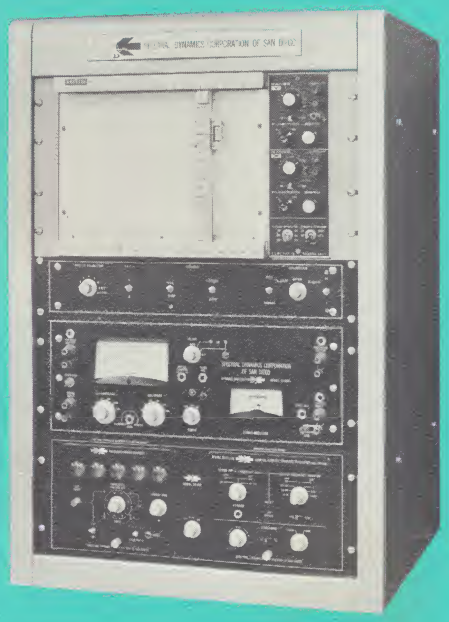
The SD-1001-1 is a highly accurate and flexible system for performing Power Spectral Density and Fourier analyses. Operating either on-line or from tape-recorded data, it performs single-channel PSD analyses over a 1 cps to 30 kc range. Additional analysis channels may be used to perform cross-spectral analysis, transfer-function analysis and other forms of analysis of dynamic data. Using the SD-101A Dynamic Analyzer as its key element, it transforms random and periodic functions into their frequency components. It produces an analog display of random functions in the widely accepted units of g^2/cps. Power Spectral Density (g^2/cps) is automatically and continuously plotted over the frequency band of interest. Periodic waves are displayed as to their frequency components, resulting in a Fourier series. Aperiodic waves are analyzed in an identical manner by being made repetitious through a tape loop. (Request Data Sheet SD-1001-1.)



SD-1001-1

SD-1005 ROTATING MACHINERY ANALYSIS SYSTEM . . .

Provides an accurate, convenient means for analyzing rotating machinery of virtually any type. Through plug-in versatility of its SD-102 Dynamic Analyzer Tuner, the SD-1005 operates in two modes. In the "Swept-Frequency" mode, it plots a *harmonic analysis* of a machine's over-all vibration characteristics under constant RPM conditions. In the "TFM" mode, it *tracks* and plots the performance of individual machine components or accessories during acceleration runs as functions of RPM. The SD-1005 is semi-portable and equally suitable for on-line applications (e.g., service and repair or production quality assurance) and taped data analysis in the development laboratory. (Request Data Sheet SD-1005.)



SD-1005

Spectral Dynamics' new administrative, engineering and manufacturing headquarters in San Diego, California

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12A

SPECTRAL DYNAMICS CORPORATION OF SAN DIEGO
P. O. BOX 671 SAN DIEGO, CALIFORNIA 92112

August 2, 1966

Mr. T. Nelson
Box 1546
Poughkeepsie,
New York 12603

Reference: Ad in ELECTRONICS

Dear Sir:

Your interest in Spectral Dynamics products is sincerely appreciated. . . . . here is the literature you requested.

To acknowledge receipt, and to allow us to supply you with additional technical information, would you please fill out the form below, fold, staple and return to us?

If you require more information, at any time in the future, please contact us again. We'd welcome the opportunity to serve you.

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POUGHKEEPSIE N Y 12603

Here is the data you requested through Reader Service card from Electronics

12A

Very truly yours,

SPECTRAL DYNAMICS CORPORATION

(FOLD LINE)

1 ☐ *Yes, I received the information I requested.*

2 *My initial interest in your product is for:*
☐ Present application ☐ Specific future application
☐ Catalog information only ☐ Possible future application

3 *I would appreciate further contact:*
☐ Now ☐ In 30 days
☐ In 3 months ☐ No further contact necessary

4 ☐ *Keep me informed of future developments, and place my name on your mailing list.*

5 *My address is:* ☐ correct ☐ incorrect
If incorrect, please indicate above.

6 *I would like information on other Spectral Dynamics Corporation products:*
Standard Products
☐ SD101A Dynamic Analyzer (Tracking Filter)
☐ SD102 Tracking Frequency Mulitplier/Sweep Oscillator
☐ SD103 Dynamic Input Sine Converter
☐ SD104 Linear/Log Sweep Oscillator ☐ SD105 Amplitude Servo/Monitor
☐ SD108 Phase Servo/Monitor ☐ Other_____
Systems
☐ SD1001 Power Spectral Density Analysis System
☐ SD1002A Automatic Mechanical Impedance Measuring System
☐ SD1005 Rotating Machinery Vibration Analysis System
☐ SD1006 Automatic Phase and Amplitude Control System
☐ Price List ☐ Other_____

7 *Can you give us the name of anyone else in your organization who would be interested in Spectral Dynamics equipment?*
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PRICE LIST

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TELEPHONE 714—278-2501 • TWX 714—279-0283

STANDARD VIBRATION INSTRUMENTATION

Model	Description	Price
SD101A	Dynamic Analyzer	$3,250*
SD101A-1	Dynamic Analyzer with SD17 Sine Rejection Adapter	3,475*
SD101AS	Dynamic Analyzer Slave	2,450*
SD102	Dynamic Analyzer Tuner (DAT) (Basic Unit)	2,995
SD102-10	General Purpose Tracking Frequency Multiplier (TFM)	990
SD102-20	Linear/Log Sweep Generator	1,200
	Other Tracking Frequency Multipliers (TFMs) (See Data Sheet SD102-TFM/9-64 for available models)	450
SD103	Dynamic Input Sine Converter	980
SD104A	Sweep Oscillator (Models SD104A-1, SD104A-2 & SD104A-5)	1,965
SD104A-P	Standard SD104A plus fixed phase outputs of 0°, 90°, 180°, 270°	2,409
SD105	Amplitude Servo/Monitor	2,330
SD1010	Carrier Generator	1,950
SD1012	Two-Channel Tracking Filter Slave	2,990*

CRYSTAL FILTERS

3 dB Bandwidth Frequency (Hz)	Part Number	Price
1.5	SD100AR-1.5	$ 550
2.0	SD100AR-2	460
5.0	SD100AR-5	340
10.0	SD100AR-10	310
20.0	SD100AR-20	310
50.0	SD100AR-50	310
100.0	SD100AR-100	310
200.0	SD100AR-200	385

*Crystal filters are not included in the above prices.
When ordering, select and specify the desired crystal filters.

ACCESSORIES

Model	Description	Price
SD11	Constant Output Level Adapter (COLA)	$ 194
SD11-1	Constant Output Level Adapter (COLA)	244
SD17	Sine Rejection Adapter (For installation at Factory only)	225
SD22	Multi-Channel Averaging Control	580
SD27	Multi-Filter Selector	1,600*
SD28	Filter Selector	1,200*
SD34	Carrier Amplifier	400

STANDARD SYSTEMS

Power Spectral Density Analysis Systems

SD1001-1	P. S. D. System with 8-1/2" x 11" Plotter	10,380*
SD1001-1A	P. S. D. System with 11" x 17" Plotter	10,645*
SD1001-2	P. S. D. System SD1001-1 with one SD27	11,980*
SD1001-2A	P. S. D. System SD1001-1A with one SD27	12,245*
SD1002A	Standard Automatic Mechanical Impedance System (With 10 Hz to 10 Hz Log Frequency Discriminator plug-in and two SD100AR-10 Filters)	18,850
	5 Hz to 5 kHz Log Frequency Discriminator plug-in	266
	20 Hz to 20 kHz Log Frequency Discriminator plug-in	266
SD1005	Rotating Machinery Vibration Analysis System	(Available on request)

*Crystal filters are not included in the above prices.
When ordering, select and specify the desired crystal filters.

MISCELLANEOUS ITEMS	Price
Special Paint (Allow 30 Days)	
Panels: SD101A, SD102, SD104A, SD105, SD1010 and SD1012	$50.00 each
Panels: SD11, SD22, SD103 and SD102 plug-in units	25.00 each
ML-200-R-OM Two-section, slide adapter compatible with Emcor Cabinet Frame No. FR26-A or equivalent	12.50 set
20013-129 Three-section, slide adapter compatible with Stantron Cabinet Frame No. F200-61-22 or equivalent	12.50 set
Power Spectral Density Graph Paper No. S-019	8.25 C
Extra copies of Instrument Instruction Manuals	5.00 each

F. O. B.: Factory - San Diego, California
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Prices: Subject to change without notice

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SPECTRAL DYNAMICS CORPORATION OF SAN DIEGO
POST OFFICE BOX 671, SAN DIEGO, CALIFORNIA 92112,
TELEPHONE 714—278-2501 • TWX 714—279-0283

SD-105 AMPLITUDE SERVO/ MONITOR

ALL SOLID STATE

FOR CONTROL OF ELECTRODYNAMIC AND HYDRAULIC SHAKERS

The NEW SD-105 Amplitude Servo/Monitor brings automatic, all electronic, solid state control to the field of vibration testing. Control amplitudes, crossover points and compression speed are controlled electronically. No mechanical or electro-mechanical device is employed at any control point in the SD-105.

The SD-105 Amplitude Servo/Monitor for automatic vibration exciter control enhances the reliability of vibration testing and simplifies its control through these important features . . .

- Compressor speed is continuously variable manually or automatically as a function of excitation frequency
- Vibration and compression levels can be pre-set prior to bringing the shaker "on-the-air"
- Automatic, thump-free crossover from displacement or velocity to acceleration
- "Greater than" control between 2 accelerometers
- Wide dynamic range (70 db minimum)
- Safety interlocked front panel switches
- Three meters for continuous display of: (1) acceleration, velocity or displacement; (2) compression; (3) acceleration
- Manual (voltage controlled) phase adjustment of 0-360°
- Less than 1% distortion 5 Hz to 10,000 Hz
- Multiple slaving for multi-shaker control applications
- Small size, light weight and minimum down-time through all-solid-state construction and plug-in printed circuit cards
- Compatible with all Spectral Dynamics Corporation tracking filters

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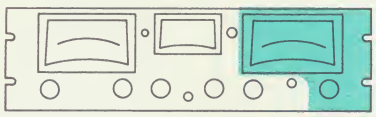
SD-105 AMPLITUDE SERVO/MONITOR

The controls and meters of the SD-105 provide operational flexibility, convenience and safety features not previously available in shaker-control instrumentation. Below, the various controls and meters are briefly explained and graphically located. Not immediately apparent from the panel itself is a valuable safety feature: all front panel switches capable of causing output transients potentially harmful to the test specimen are "interlocked." Thus, if an operator turns a critical switch *during* the course of a test, the SD-105 will automatically bring the shaker drive safely to zero.

A-V-D CHANNEL Acceleration, velocity or displacement can be monitored and controlled from an accelerometer input. Velocity or displacement can be monitored and controlled from a velocity pickup input.

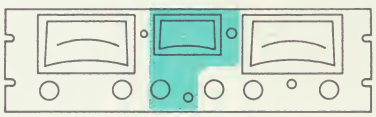
Automatic "thump-free" crossover from constant velocity or constant displacement to constant acceleration is provided. A green indicator lamp indicates that the automatic crossover function is operational. When using the automatic crossover feature, displacement or velocity level is preset in the A-V-D Channel.



ACCELERATION CHANNEL is used for several functions:

A. Automatic Crossover. For constant D-A or V-A testing, the acceleration level is preset. When the sinusoidal acceleration level becomes equivalent to the preset displacement or velocity, the SD-105 automatically transfers control from the A-V-D channel to the Acceleration channel. The crossover point does not depend on a specific frequency preset by the operator but is a function of control amplitude only.

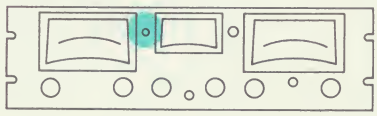
B. Protection. When conducting a constant-acceleration test using the A-V-D channel, the Acceleration channel can be connected to a separate accelerometer mounted in the same area as the control accelerometer. If either control accelerometer malfunctions or a lead is broken, other channel automatically takes over and controls shaker.



C. Monitoring or Acceleration Control. The Acceleration channel can be connected to an accelerometer mounted at a critical point on the specimen, while controlling the input acceleration level on the A-V-D channel. The SD-105 can then be used to monitor the second accelerometer and indicate transmissibility at the critical point, or it can be programmed to control on the larger of the two inputs.

COMPRESSION DISPLAY/SPEED CONTROL The SD-105 can be operated in a MANUAL or AUTOMATIC mode, and compressor speed is continuously variable over the entire range. In the AUTO mode the compressor speed increases directly as a function of excitation frequency. In addition, a front panel screwdriver LIMIT adjustment provides a convenient means of optimizing the servo loop for stable operation at the higher frequencies when used with tracking filters. The center meter provides continuous monitoring of the compression level.

PRESET OPERATION The vibration test parameters can be pre-programmed in the SD-105 *prior* to exciting the test specimen. This helps prevent the operator from exceeding the specified vibration level in bringing the system "on-the-air" and also eliminates the need for exciting the specimen before the actual test is begun.



INTERLOCK PROTECTION All potentially dangerous range and mode switches are "interlocked." If one is switched, the output to the shaker Power Amplifier is brought safely to zero and maintained at zero until the SD-105 is reset. The right hand switch (acceleration range) is interlocked only in the AUTO crossover mode; also, the compressor switch may be changed between AUTO and MANUAL without activating the interlock. The interlock feature may be easily bypassed by the operator if he so desires.

PHASE ADJUSTMENT Continuously variable phase adjustment of 0° to 360° is provided. This is a voltage controlled phase adjustment brought to a rear connector to facilitate application of an external phase-control voltage.

TYPICAL APPLICATIONS OF "SOS" (Sweep Oscillator Servo) SYSTEM

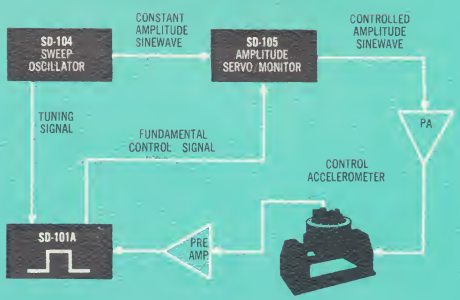
SD-105 AMPLITUDE SERVO/MONITOR plus SD-104 SWEEP OSCILLATOR

The SD-105 Amplitude Servo/Monitor finds widest application in the control of shakers used in environmental vibration testing. Combined with the SD-104 Sweep Oscillator, as shown below, it serves as a "Sweep Oscillator Servo" System for programming . . . controlling . . . monitoring . . . *and protecting* critical vibration tests. The System works with both hydraulic and electro-dynamic shakers. (Note: While the SD-105 is an efficient companion unit to the SD-104 Sweep Oscillator, it is self-contained and not dependent on the latter for proper operation.)

The small size and light weight of the SD-105/SD-104 "Sweep Oscillator Servo" —total weight only 45 pounds; height 10½" —facilitates changing of test set-ups.

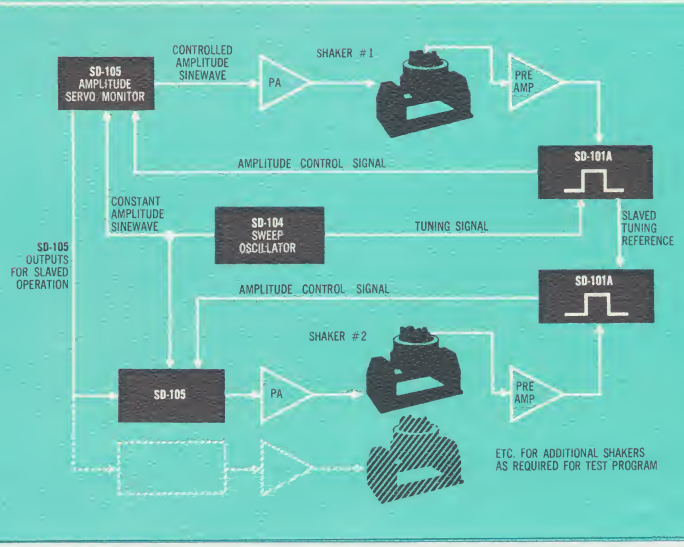
AUTOMATIC AMPLITUDE CONTROL — SINGLE SHAKER

The SD-105 in combination with its companion SD-104 forms a complete Sweep Oscillator Servo ideally suited for control of a single vibration exciter system. The SD-105 and SD-104 are both completely solid state and employ plug-in printed circuit cards. Down time is thus minimized and trouble shooting greatly simplified. An SD-101A Tracking Filter may be used optionally with the SD-105/SD-104, thus assuring standardized control of fundamental amplitude only.



AUTOMATIC AMPLITUDE CONTROL — MULTI-SHAKER

Operation of multiple shakers for testing large or complex specimens is greatly facilitated by the SD-105 Amplitude Servo/Monitor. Each SD-105 has provision for O-360° manual phase adjustment, and phase coherency among a number of shakers is thus easily established. All critical parameters of the SD-105 are voltage controlled. This permits easy slaving and assembly of multi-shaker control systems on a "building-block" basis. Automatic phase control can be provided using additional Spectral Dynamics instruments.



SPECIFICATIONS

MODEL SD105 AMPLITUDE SERVO/MONITOR

FREQUENCY RANGE:

5 Hz to 10,000 Hz

INPUT RANGES:

Acceleration:
1, 10, 100 and 1000 g's (full scale ranges) from accelerometer input. (Two accelerometer inputs, A_1 and A_2)

Velocity:
0.1, 1, 10 and 100 inches/second (full scale ranges) from an accelerometer or velocity pickup input

Displacement:
0.01, 0.1, 1 and 10 inches peak-to-peak (full-scale ranges)

Compression:
0 to over −70 db with meter scale calibrated in 10 db increments

MONITORING:

Three meters are provided for continuous monitoring of:

1. Acceleration, velocity, or displacement (A_1 input only)
   Accuracy: ± 4% of full scale, 10 Hz to 10 kHz, down approx. 4% at 5 Hz
2. Compression level
3. Acceleration level from input A_1 or A_2
   Accuracy: ± 4% of full scale, 10 Hz to 10 kHz, down approx. 4% at 5 Hz

INPUT SENSITIVITIES:

Acceleration:
10 mv (peak)/g (peak)

Velocity:
96.3 mv(peak)/(peak) inch/second

IMPEDANCES:

Input: 80 k ohm per accelerometer input; 40 k ohm—velocity input
Output: Less than 100 ohms.

INPUT LEVEL:
OUTPUT LEVEL:

1 volt RMS (nominal) from sweep oscillator
5 volts RMS maximum

DYNAMIC RANGE:

70 db minimum

DISTORTION:

Less than 1% (5K ohm or higher impedance load)
(Total distortion of SD104 Oscillator plus SD105 Servo)

CROSSOVER:

Automatic "thump-free" crossover from displacement, velocity or acceleration *to* acceleration is provided

NOISE LEVEL:

Greater than 80 db below full output

PRESET OPERATION:

Vibration and compression levels can be preset by use of front panel controls prior to exciting specimen

COMPRESSOR:

Correction Accuracy: 20 db/0.5 db; 40 db/1.0 db; 60 db/1.5 db

Modes of Operation:

MANUAL—Continuously variable over equivalent range of 10-3000 db/second

AUTOMATIC—Continuously variable between an upper limit of 300 to 3000 db/second from a starting point of 10 db/second. Note: In "Auto" mode of operation, the compressor speed varies continuously as a function of frequency from 10 db/sec to the upper limit. Capacitors and/or resistors are not switched to select compressor speeds.

INTERLOCK:

All front panel switches involving mode or range of operation are interlocked. If an operator turns a potentially harmful switch during the course of a test, the servo output is brought to zero at the operating compression speed. The interlock feature may be bypassed at the operator's option.

PHASE CONTROL:

Continuously variable phase adjustment of 0° to 360° is provided by a front panel control

POWER:

115/230 volts ac, 50/60 Hz at approximately 60 watts

SIZE & WEIGHT:

5.25″ high x 19″ wide x 15″ deep (13.3 cm x 48.2 cm x 38.1 cm); Approximately 25 pounds (11.3 kg.)

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